

**Commercial
Space
Transportation
License**

License Number: LSO 04-009

**EAST KERN
AIRPORT DISTRICT**

is authorized, subject to the provisions of 49 USC
Subtitle IX, ch. 701, and the orders, rules, and
regulations issued under it, to operate a launch site.

General. The licensee is authorized, as defined herein, to
operate a launch site at Mojave Airport in Mojave, California

This license is granted subject to the terms,
conditions, and limitations set forth in licensing
order A , and any subsequent orders issued by
the Associate Administrator for Commercial Space
Transportation.

The licensee shall at all times conduct its operations
in accordance with the regulations prescribed by the
Associate Administrator for Commercial Space
Transportation for the activities authorized by this
license.



US Department
of Transportation
Federal Aviation
Administration

800 Independence Ave., S.W.
Washington, D.C. 20591

Issued On: June 17, 2004

Effective On: June 17, 2004

A handwritten signature in cursive script, reading "Carol A. Flores", is written over a horizontal line.

Manager, Licensing and Safety Division

ASSOCIATE ADMINISTRATOR FOR COMMERCIAL SPACE TRANSPORTATION

LICENSE ORDER REGARDING OPERATION OF A
LAUNCH SITE

AUTHORIZED BY LICENSE NO. LSO 04-009
ISSUED TO

EAST KERN AIRPORT DISTRICT

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1. Authority: This Order is issued to East Kern Airport District (referred to as EKAD) under 49 U.S.C. §§70101-70121, and the Commercial Space Transportation Licensing Regulations (Regulations), 14 C.F.R. Ch. III.
 2. Purpose: This Order modifies License No. LSO 04-009, issued on June 17, 2004, by the Federal Aviation Administration Associate Administrator for Commercial Space Transportation (FAA/AST), authorizing EKAD to operate certain portions of the Mojave Air and Space Port as a launch site at Mojave, California, and prescribes as conditions to License No. LSO 04-009 certain additional requirements applicable to the authorization to operate a launch site at Mojave Air and Space Port.
 3. Authorization: EKAD is authorized to operate a launch site at Mojave Air and Space Port:
 - (a) consisting of runways 8-26 and 12-30, and an area with a 1250 foot radius centered at 35° 04' 21.44" North latitude and 118° 09' 19.44" West longitude
 - (b) to support suborbital reusable launch vehicle missions authorized by an FAA license or permit to take-off at Mojave Air and Space Port.
 4. Explosive Siting Requirements : EKAD must comply with the following requirements within the launch site boundary:
 - (a) for any explosive hazard facility where handling of incompatible energetic liquids occurs, EKAD may have no more than 30,000 pounds in TNT equivalent weight of the energetic liquids at each explosive hazard facility.

- (b) for any explosive hazard facility where handling of incompatible energetic liquids occurs and the quantity of liquids is more than 450 pounds of TNT equivalent weight, EKAD shall restrict public foot traffic to a radius of not less than 1250 feet and public vehicular traffic to a radius of not less than 750 feet during handling of incompatible energetic liquids. Handling of incompatible energetic liquids includes engine test firing.
 - (c) for any explosive hazard facility where handling of incompatible energetic liquids occurs and the quantity of liquids is 450 pounds of TNT equivalent weight or less, EKAD may establish a distance of less than 1250 feet in accordance with Table C9.T2 and C9.4.1.2.1.1.1 of DOD 6055.9 - STD, Oct. 5, 2004, as the distance within which members of the public may not enter.
 - (d) for the storage of LOX, kerosene and isopropyl alcohol, EKAD must comply with National Fire Protection Association (NFPA) standards #55 (2005 edition) and #30 (2008 edition) for separation distance and spill containment requirements. For the storage and handling of other energetic liquids, including nitrous oxide, EKAD must provide FAA/AST a plan for the safe storage and handling of these materials.
 - (e) for all handling and storage of energetic liquids, EKAD must maintain the appropriate intraline distance. This distance must account for all quantities of energetic liquids to ensure appropriate minimum separation is maintained between the source of the explosive hazard and each public area, including each public road. EKAD must use DOD 6055.9-STD of Oct. 5, 2004 or Appendix A to calculate the TNT equivalent weight of the energetic liquids. EKAD must also use DOD 6055.9-STD of Oct. 5, 2004, to determine the intraline and public area distances for a given TNT equivalent weight.
- 5. Any hazardous launch vehicle processing, including propellant loading, installation of linear shaped charges, installation and activation of pyrotechnic devices, installation of solid rocket boosters, or other operations that could present a hazard to the public must be conducted within the launch site boundary in accordance with appropriate public area distances.
 - 6. All vehicles, including aircraft, not participating in the licensed or permitted activities must be separated from

launch vehicle ground operations at a distance equal to the public area distance.

7. License Term: The term of License No. LSO 04-009 authorizing EKAD to operate a launch site at Mojave Air and Space Port is five (5) years from June 17, 2009, the effective date of the renewal.

ASSOCIATE ADMINISTRATOR FOR COMMERCIAL SPACE TRANSPORTATION

By: Kenneth Wong

Kenneth Wong, Manager
Licensing and Safety Division

Issued: May 5, 2009

Effective: June 17, 2009

Revision History:

Original License Order - Issued June 17, 2004

Revision 1 - Issued December 20, 2007

1) Eliminates paragraphs 3, 5, 7, 8, 9, 10 and 11 because they repeat what 14 CFR part 420 already requires, and rennumbers paragraph 12 as paragraph 5.

2) Changes paragraph 4 to paragraph 3 and revises as follows:

Authorization: EKAD is authorized to operate a launch site at Mojave Air and Space Port:

- (a) consisting of runways 8-26 and 12-30, and those facilities involved in preparation of a launch vehicle for flight, including
 - i) the hangars used by Scaled Composites, LLC and XCOR Aerospace; and
 - ii) an area with a 1250 foot radius centered on the test site at 35° 04' 21.44" North latitude and 118° 09' 19.44" West longitude.
- (b) to support suborbital reusable launch vehicle missions authorized by an FAA license or permit to take-off at Mojave Air and Space Port.

3) Replaces in its totality paragraph 6 with paragraph 4 as follows:

Explosive Siting Requirements: EKAD must comply with the following requirements:

- (a) for any explosive hazard facility where handling of incompatible energetic liquids occurs within the launch site boundary, EKAD may have no more than 30,000 pounds in net explosive weight of the energetic liquids at each explosive hazard facility.

- (b) for any explosive hazard facility where handling of incompatible energetic liquids occurs within the launch site boundary, EKAD shall restrict foot traffic of all members of the public to a radius of 1250 feet and vehicular traffic to a radius of 750 feet during handling of energetic liquids. Handling of incompatible energetic liquids includes engine test firing.
- (c) for any explosive hazard facility where the quantity of energetic liquids is 450 pounds of net explosive weight or less, EKAD may establish a distance of less than 1250 feet in accordance with Table C9.T2 and C9.4.1.2.1.1.1 of DOD 6055.9 - STD, Oct. 5, 2004, as the distance within which members of the public may not enter.
- (d) for the storage of LOX, kerosene and isopropyl alcohol within the launch site boundaries, EKAD must comply with National Fire Protection Association (NFPA) standards #55 (2005 edition) and #30 (2008 edition) for separation distance and spill containment requirements.
- (e) for all energetic liquids within the launch site boundaries, regardless of whether those energetic liquids are used for an aircraft or a launch vehicle, EKAD must maintain an intraline distance or EKAD must account for all quantities of energetic liquids to determine the distance for separating the explosive hazard facility from each public area, including each public road. EKAD must use DOD 6055.9-STD of Oct. 5, 2004, to determine the intraline and public area distances.

Revision 2 - Issued September 25, 2008

1) Revises paragraph 3(a) as follows:

- (a) consisting of runways 8-26 and 12-30, and an area with a 1250 foot radius centered at 35° 04' 21.44" North latitude and 118° 09' 19.44" West longitude

2) Revises paragraph 4 as follows:

Explosive Siting Requirements : EKAD must comply with the following requirements within the launch site boundary:

- (a) for any explosive hazard facility where handling of incompatible energetic liquids occurs, EKAD may have no more than 30,000 pounds in TNT equivalent weight of the energetic liquids at each explosive hazard facility.
- (b) for any explosive hazard facility where handling of incompatible energetic liquids occurs and the quantity of liquids is more than 450 pounds of TNT equivalent weight, EKAD shall restrict public foot traffic to a radius of not less than 1250 feet and public vehicular traffic to a radius of not less than 750 feet during handling of incompatible energetic liquids. Handling of incompatible energetic liquids includes engine test firing.
- (c) for any explosive hazard facility where handling of incompatible energetic liquids occurs and the quantity of liquids is 450 pounds

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of TNT equivalent weight or less, EKAD may establish a distance of less than 1250 feet in accordance with Table C9.T2 and C9.4.1.2.1.1.1 of DOD 6055.9 - STD, Oct. 5, 2004, as the distance within which members of the public may not enter.

- (d) for the storage of LOX, kerosene and isopropyl alcohol, EKAD must comply with National Fire Protection Association (NFPA) standards #55 (2005 edition) and #30 (2008 edition) for separation distance and spill containment requirements. For the storage and handling of other energetic liquids, including nitrous oxide, EKAD must provide FAA/AST a plan for the safe storage and handling of these materials.
- (e) for all handling and storage of energetic liquids EKAD must maintain the appropriate intraline distance. This distance must account for all quantities of energetic liquids to ensure appropriate minimum separation is maintained between the source of the explosive hazard and each public area, including each public road. EKAD must use DOD 6055.9-STD of Oct. 5, 2004 or Appendix A to calculate the TNT equivalent weight of the energetic liquids. EKAD must also use DOD 6055.9-STD of Oct. 5, 2004, to determine the intraline and public area distances for a given TNT equivalent weight.

3) Replaces paragraph 5 with the following and rennumbers paragraph 5 as paragraph 7.

Any hazardous launch vehicle processing, including propellant loading, installation of linear shaped charges, installation and activation of pyrotechnic devices, installation of solid rocket boosters, or other operations that could present a hazard to the public must be conducted within the launch site boundaries in accordance with appropriate public area distances.

4) Adds paragraph 6 as follows:

All vehicles, including aircraft, not participating in the licensed or permitted activities must be separated from launch vehicle ground operations at a distance equal to the public area distance.

Revision 3 - Issued May 5, 2009

- 1) In paragraph 7, change the term of the authorization from originating on the effective date of the original license to "from June 17, 2009, the effective date of the renewal".

Appendix A

GUIDE TO CALCULATION OF TNT EQUIVALENT WEIGHT

1. Determine total weight of incompatible energetic liquids as described below. For converting volume to weight, use density factors of Table C9.T17 of DoD 6055.9-STD, 5 October 2004.
2. Use Table 1 to calculate TNT equivalent weight.
3. In calculating the weight used in determining the TNT equivalent weight, include all propellants present in the launch vehicle, or, if no launch vehicle is present, the total weight in test stand run tankage and piping for which there are no positive means to prevent mixing in credible mishaps.
4. If a vehicle or aircraft is participating in the licensed or permitted activities and is operated within the intraline distance from the launch vehicle or test stand the launch site operator will perform a hazard analysis or maximum credible event analysis to establish the minimum distance to public areas. This analysis will follow industry best practices and be available for inspection prior to such operations.
5. For small launch vehicles containing hydrogen peroxide > 60% as a monopropellant, or similar pressure vessels that provide heavy confinement (burst pressure greater than 100 psi), use 800 ft for intraline, public road, and public area distances.

Table 1. Energetic Liquid Explosive Equivalents^{1,2,3,4}

Energetic Liquids	TNT Equivalence	
	Static Test Stands	Range Launch
LO ₂ /LH ₂	See Note 3	See Note 3
LO ₂ /LH ₂ + LO ₂ /RP-1	Sum of (see Note 3 for LO ₂ /LH ₂) + (10% for LO ₂ /RP1)	Sum of (see Note 3 for LO ₂ /LH ₂) + (20% for LO ₂ /RP1)
LO ₂ /RP-1	10%	20% up to 500,000 lbs Plus 10% over 500,000 lbs
IRFNA/UDMH ¹	10%	10%
N ₂ O ₄ /UDMH + N ₂ H ₄ ⁴	5%	10%
N ₂ O ₄ liquid oxidizer + PBAN solid fuel (Hybrid propellants)	15%	15%

¹ The percentage factors given in the table are to be used to determine equivalencies of energetic liquids mixture at static test stands and launch pads when such energetic liquids are located aboveground and are unconfined

except for tankage. Other configurations shall be considered on an individual basis to determine equivalencies.

² The equivalencies apply also for the following substitutions:

Alcohols (e.g. methanol, ethanol) or other hydrocarbons (e.g. methane, propane, kerosene) for RP-1

H₂O₂ for LO₂ (only when LO₂ is in combination with RP-1 or equivalent hydrocarbon fuel)

MMH for N₂H₄, UDMH, or combinations of the two.

³ For siting launch vehicles and static test stands, TNT equivalent weight is the larger of:

(a) The weight equal to $8W^{2/3}$ where W is the weight of LO₂/LH₂; or

(b) 14 percent of the LO₂/LH₂ weight.

⁴ These are hypergolic combinations.

Maximum Credible Event (MCE): In hazard evaluation, the MCE from a hypothesized accident explosion, fire, or agent release is the worst single event that is likely to occur from a given quantity and disposition of explosives, chemical agents, or reactive material. The event must be realistic with reasonable probability of occurrence considering the explosion propagation, burning rate characteristics, and physical protection given to the items involved